AQUATIC INVASIVE SPECIES PROGRAM
UTAH DIVISION OF WILDLIFE RESOURCES

SOUTHERN REGION SUMMARY

(January 1 thru December 31, 2012)

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General

UDWR's new Utah Division of State Parks and Recreation (SP&R) contract for aquatic invasive species (AIS) management has proven to be a success. Implementation shows that the number of boats interdicted (inspection, boater AIS education and boat decontamination when needed) has increased. Also, compliance with the required Decontamination Certification Form has increased, too. SP&R at the state parks and the National Park Service (NPS) at Lake Powell have a distinct visibility advantage, since personnel are present during all hours of operation, making pre-launch AIS contacts. The public is acutely aware of the State of Utah's AIS program, and they expect to be contacted by natural resource management employees, regardless of whether or not the representative is with Utah Division of Wildlife Resources (UDWR), SP&S or NPS.

Region-wide Operations

One Biologist I position was funded for 12 months by UDWR ($64,573) to manage the regional AIS Program and to supervise the Wildlife Technician I positions. Additionally, the Biologist coordinated multiple state parks in their implementation of the Utah Aquatic Invasive Species Management Plan (Plan).

> **Note:** One Wildlife Technician II position was not funded, since the contract with SP&R allowed for a reduction in the number of UDWR Technician I positions, allowing the Biologist to supervise all of them.

Multiple Wildlife Technician I positions and Lead Ranger Aides performed AIS duties at individual water bodies or state parks during the highest boating periods.

In summary the following was accomplished by AIS staff in the region performing for UDWR, SP&R, National Park Service (NPS) at Glen Canyon National Recreation Area (Lake Powell) or partner agencies:

- 20,876 boats on water bodies other than Lake Powell were interdicted pre-launch and inspected.
    - 57,560 folks (actual count) while boating on water bodies other than Lake Powell, which includes the boat operator and those who accompanied them, were educated about:
      (1) Risks from quagga and zebra mussels; and
      (2) How to self-decontaminate the boat.
    - An additional 100,000 boats were interdicted pre-launch and inspected at Lake Powell, facilitating education of another 224,000 folks.

Note: The actual count for numbers of people educated on waters other than Lake Powell shows an average of 2.76 folks per boat to participate, regardless of whether the boat was being used for fishing and/or other recreational purposes.

- 1,602 boats were professionally decontaminated on water bodies other than Lake Powell due to their operators' stated use within the prior 30 days on a quagga, zebra or false dark mussel affected water body.
    - 6 quagga mussel encrusted boats were interdicted and decontaminated: 2 at Port of Entry (St. George) Administrative Checkpoints; 1 at Sand Hollow Reservoir; 1 at Panguitch Lake; 1 near Lake Powell on Highway 89; and 1 at the SRO main office. **Note:** (1) The boat near Lake Powell contained live mussels. It was a 100-foot paddlewheel boat, with complicated raw water circulation systems. So, it was quarantined for 29 days in order to kill undiscovered mussels via desiccation.
      (2) All other invasive mussel encrusted boats had only dead mussels, since they had been out of the infested origination water for at least 30 days or had been previously professionally decontaminated unsuccessfully.
- 4,000 boats were professionally decontaminated at Lake Powell due to their operators' stated use within the prior 30 days on a quagga, zebra or false dark mussel affected water body.
    - 39 mussel encrusted boats were interdicted and decontaminated at Lake Powell. All were decontaminated and most were quarantined in order to kill undiscovered mussels via desiccation.
- Public presentations were made at the Utah Boat Show, International Sportsman Expo, Utah Water Users Workshop and Southern Utah University classes where students were majoring in Outdoor Recreation.
- Local boat shops and watercraft rental locations were contacted to educate employees about invasive mussels and supply them with Decontamination Certification Forms and "No Mussels!" brochures for their customers.
- Several media releases occurred on the radio and television and in local area newspapers.
- 853 hours were worked by volunteers, equaling $17,799 of labor, under authority of UDWR's Volunteer Program, targeting watercraft interdiction, inspection for AIS, decontamination of boats and general education about quagga and zebra mussel issues at the Sand Hollow State Park Complex.
- Plankton samples were taken from multiple water bodies across the region. All samples showed no microscopic evidence of veligers (larvae) or other evidence for quagga or zebra mussels, except eDNA for quagga mussels continues to be measured via qPCR at Sand Hollow.
- Watercraft Inspection and Decontamination Training (WIT) as either level I or level II occurred for all DWR Technician I & II positions and all SP&R and NPS employees involved with AIS boat inspections at state parks, non-state park waters and Lake Powell within the region. The training was also provided to other natural resource management agencies; and select personnel at marinas.

- AIS Biologist conducted AIS presence/absence inspections at State Fish Hatcheries and at origination and destination sites for wild fish transfers to minimize inadvertent spread of AIS through routine wildlife management practices.
- Law Enforcement personnel from UDWR, SP&R and NPS or their partners made thousands of contacts to enforce Rule R657-60. These contacts are not included in the region or statewide totals, but stand alone. Most of the contacts were outreach oriented, although many involved issuance of a non-compliance notice, and a few written "warning" or "notice to appear in court" citations were issued. Compliance rates are considered to be good and improving.
    - 284 vehicles were recorded into the FATPOT law enforcement data sharing system as not being in compliance with the Decontamination Certification process; all were issued written notices for non-compliance.
    - Three Administrative Checkpoints were conducted at the St. George Port of Entry: one each in April, May and June; all operated for 5 hours each. They resulted in interdiction of 69 boats of which 26 required decontamination. Two decontaminated boats were encrusted with quagga mussels, and a third contained an invasive Asian Clam.

Southern Region Water-By-Water Reports (listed in alphabetical order)

Fish Lake, Lake Powell, multi-reservoir complex (New Castle, Enterprise, Minersville and Kolob reservoirs), Otter Creek/Piute reservoir complex (Otter Creek Reservoir and Piute Reservoir), Panguitch Lake and Sand Hollow State Park Complex (Sand Hollow, Quail Creek and Gunlock reservoirs)

<u>Fish Lake</u>

- The budget was $11,402 and AIS personnel performed for 3.11 months (Memorial Day thru Labor Day) or 0.26 FTE as follows:
    - UDWR implemented the Plan.
        - 1 UDWR funded Technician I position.
          Note: The Technician resigned in mid July after 1.5 months on the job.
        - Gary Moulton (concessionaire and operator of two marinas at Fish Lake) was trained at the WIT I level and funded $3,680 through a Grant agreement to implement the AIS program at Fish Lake from July 23rd, 2012 to September 15th, 2012.
- One $13,400 trailer-mounted decontamination unit purchased by UDWR with General Fund in an earlier fiscal year is stationed at the lake.
- 55 boats were interdicted, inspected as needed, and educated about AIS.
    - 153 AIS contacts were educated.
- No boats needed professional decontamination due to a lack of their stated use within the prior 30 days on a quagga, zebra or false dark mussel affected water body.
    - No boats were encrusted with invasive mussels.
- Boater History of Last Water Visited (N = 55 interviews)

Top 5 Last Waters Visited

1. Fish Lake = 30 (55%)
2. Otter Creek Reservoir = 3 (5%)
3. Yuba Reservoir = 3 (5%)
4. Strawberry Reservoir = 2 (4%)
5. Other/Unknown = 17 (31%)

- Plankton samples for presence/absence of *Dreissena* veligers were collected and sent to the Bureau of Reclamation's microscopy lab in Denver, CO; all were found to be negative.
- Regional Conservation Officers and State Park Rangers assisted with the interdiction, inspection and education of boaters during their routine boater/angler checks. Written warnings citations were given to boaters that were non-compliant with the self-certification process. No "Notice to Appear" in court citations was issued.
    - 118 launch vehicles were recorded in the FATPOT system as non-compliant for display of the Decontamination Certification Form; all were issued a written non-compliance notice.

Lake Powell (Glen Canyon National Recreation Area)

- NPS implemented the Plan yearlong.
    - UDWR annually provides the NPS at the Glen Canyon National Recreation Area a $22,000 grant for use in implementing their yearlong, $1,000,000 AIS management program. Generally, NPS is able to double and triple the value of UDWR's grant by using it for match with other grants they secure for AIS management.
        - Multiple NPS rangers and technicians perform in the NPS's AIS program at Lake Powell. Additionally, they operate their own microscopy and PCR lab in Page, Arizona.
        - Multiple boat decontamination units (6 units: Hite, Halls Crossing, Bullfrog, Wahweap, Stateline and Antelope Point) are stationed strategically around the lake.
- All arriving boats are screened as a low risk inspection. And based upon findings, some are screened as a high risk inspection, which can lead to a professional decontamination. Once a boat passes the inspection process, its operator is issued a "Mussel Free" launch certificate for display in the launch vehicle, and allowed to launch.
    - A self-certification process exists for boaters to use in back country locations.
- 100,000 boats were interdicted pre-launch and inspected at Lake Powell.
    - 224,000 folks (estimated count) while boating on Lake Powell, which includes the boat operator and those who accompanied them, were educated about:
      (3) Risks from quagga and zebra mussels; and
      (4) How to self-decontaminate the boat.

      Note: The estimated count for numbers of people educated on Lake Powell used an average of 2.76 folks per boat to participate, regardless of whether the boat was

being used for fishing and/or other recreational purposes. This expansion number was derived from actual counts in Utah's Northeastern and Southern regions (N = 84,504 boat contacts).

- 4,000 boats at Lake Powell needed to be professionally decontaminated prior to being allowed to launch.
    - 39 of the decontaminated boats were discovered to be encrusted with quagga mussels (all seemed dead). All of the encrusted boats were quarantined to kill any undetected mussels via desiccation, professionally decontaminated twice, and ultimately released to their owners.
- Boater use history is as follows:
  Note: Lake Powell was determined to be the #3 destination for boaters departing Lake Mead (N = 256).

    - **Southern Lake Powell Boaters (N = 6,863):** The following example portrays pre-arrival and post departure use patterns by boaters who launched from the Wahweap, Antelope Point & Stateline ramps of Lake Powell between March 1 and July 31, 2008.

Top 10 Origination Waters	Top 10 Destination Waters
Lake Pleasant AZ (infested--quagga)	Sand Hollow Reservoir UT
Utah Lake UT	Utah Lake UT
Lake Mead NV & AZ (infested--quagga)	Pineview Reservoir UT
Sand Hollow Reservoir UT	Jordanelle Reservoir UT
Roosevelt Lake AZ	Canyon Lake AZ
Jordanelle Reservoir UT	Flaming Gorge Reservoir UT & WY
Saguaro Lake AZ	Bear Lake UT & ID
Canyon Lake AZ	Roosevelt Lake AZ
Lake Havasu AZ & CA (infested--quagga)	Quail Creek Reservoir UT
Bartlett Lake AZ	Yuba Reservoir UT

    - **Northern Lake Powell Boaters (N = 991):** The following example portrays pre-arrival and post departure use patterns by boaters who launched from the Bullfrog, Hall's Crossing & Hite ramps of Lake Powell between March 1 and July 31, 2008.

Top 10 Origination Waters	Top 10 Destination Waters
Utah Lake UT	Utah Lake UT
Blue Mesa Reservoir CO (inconclusive)	Flaming Gorge Reservoir UT & WY
Highland State Park CO	Blue Mesa Reservoir CO
Flaming Gorge Reservoir UT & WY	Highland State Park CO
Strawberry Reservoir UT	Strawberry Reservoir UT
Rifle Gap Reservoir CO	Rifle Gap Reservoir CO
Bear Lake UT & ID	Chatfield Reservoir CO
Chatfield Reservoir CO	Scofield Reservoir UT
Scofield Reservoir UT	McPhee Reservoir CO
McPhee Reservoir CO	Deer Creek Reservoir UT

- Lake Powell was classified as "inconclusive" in 2007 relative to Dreissena mussel veligers due to conflicting microscopy and PCR results. Despite monthly plankton microscopy and PCR assessments for environmental DNA (eDNA) during the boating seasons of the intervening years (2008-2010), no other Dreissena evidence was found. Thus, Lake Powell was declassified in late 2010 from "inconclusive" to "not detected."
- No microscopy or PCR evidence of eDNA for Dreissenids occurred in 2011 following more than 160 lake wide samples.
- Unfortunately, Lake Powell was classified as "detected" in early fall 2012 relative to Dreissena mussels. Quagga mussel veligers, observed microscopically and supported by PCR detections for eDNA and DNA sequencing were verified. To date only 6 veligers and 8 additional eDNA detections have occurred; all in the lake's lower six mile length between Antelope Point Marina and the Glen Canyon Dam (Lake Powell is approximately 200 miles long.). The NPS continues to lead assessment of this unfolding situation, working toward development of a Utah required Control Plan in cooperation with UDWR, the Arizona Game and Fish Department and the ad hoc Lake Powell Zebra Mussel Prevention Group. Ongoing prevention management may prevent the entry of additional mussel larvae. If there aren't enough mussels to become self-sustaining, the population may fail. Monitoring continues.

<u>Multi-reservoir complex (New Castle, Enterprise, Minersville and Kolob reservoirs)</u>

- The budget was $18,332 and AIS personnel performed for 5 months or 0.42 FTE to rove between multiple regional waters as follows:
    - UDWR implemented the Plan.
        - 1 UDWR funded Technician I position.

<u>Newcastle Reservoir</u>

- Effort typically involved one 8-hr shift per week between mid April and mid September.
- One $13,400 trailer-mounted decontamination unit purchased by UDWR with General Fund in an earlier fiscal year is stationed at the Southern Region office; it was used when required.
- 18 boats were interdicted, inspected as needed, and educated about AIS.
- 35 AIS contacts were educated.
- No boats needed professional decontamination due to a lack of their stated use within the prior 30 days on a quagga, zebra or false dark mussel affected water body.
    - No boats were encrusted with invasive mussels.
- Boater History of Last Water Visited (N = 18 interviews)

<u>Top 5 Last Waters Visited</u>

1. New Castle Reservoir = 8 (44%)
2. Enterprise Reservoir = 3 (17%)

3. Panguitch Lake = 2 (11%)
4. Sand Hollow Reservoir = 2 (11%)
5. Other/Unknown = 3 (17%)

- Plankton samples for presence/absence of *Dreissena* veligers were collected and sent to the Bureau of Reclamation's microscopy lab in Denver, CO; all were found to be negative.
- Regional Conservation Officers and State Park Rangers assisted with the interdiction, inspection and education of boaters during their routine boater/angler checks. Written warnings and Notice to Appear in court citations was issued as needed.
    - 9 launch vehicles were recorded in the FATPOT system as non-compliant for display of the Decontamination Certification Form; all were issued a written non-compliance notice.

Enterprise Reservoir

- Effort typically involved one 8-hr shift per week between mid April and mid September.
- One $13,400 trailer-mounted decontamination unit purchased by UDWR with General Fund in an earlier fiscal year is stationed at the Southern Region office; it was used when required.
- 15 boats were interdicted, inspected as needed, and educated about AIS.
- 23 AIS contacts were educated.
- No boats needed professional decontamination due to a lack of their stated use within the prior 30 days on a quagga, zebra or false dark mussel affected water body.
    - No boats were encrusted with invasive mussels.
- Boater History of Last Water Visited (N = 15 interviews)

    Top 3 Last Waters Visited

    1. Enterprise Reservoir = 11 (73%)
    2. Sand Hollow Reservoir = 3 (20%)
    3. Lake Mead = 1 (7%)
- Plankton samples for presence/absence of *Dreissena* veligers were collected and sent to the Bureau of Reclamation's microscopy lab in Denver, CO; all were found to be negative.
- Regional Conservation Officers and State Park Rangers assisted with the interdiction, inspection and education of boaters during their routine boater/angler checks. Written warnings and Notice to Appear in court citations was issued as needed.
    - 18 launch vehicles were recorded in the FATPOT system as non-compliant for display of the Decontamination Certification Form; all were issued a written non-compliance notice.

Minersville Reservoir

- Effort typically involved one 8-hr shift per week between mid April and mid September.

- One $13,400 trailer-mounted decontamination unit purchased by UDWR with General Fund in an earlier fiscal year is stationed at the Southern Region office; it was used when required.
- 152 boats were interdicted, inspected as needed, and educated about AIS.
- 227 AIS contacts were educated.
- No boats needed professional decontamination due to a lack of their stated use within the prior 30 days on a quagga, zebra or false dark mussel affected water body.
    - No boats were encrusted with invasive mussels.
- Boater History of Last Water Visited (N = 152 interviews)

    Top 5 Last Waters Visited

    1. Minersville Reservoir = 109 (72%)
    2. Lake Powell = 10 (7%)
    3. Sand Hollow Reservoir = 6 (4%)
    4. Quail Creek Reservoir = 5 (3%)
    5. Other/Unknown = 22 (14%)
- Plankton samples for presence/absence of *Dreissena* veligers were collected and sent to the Bureau of Reclamation's microscopy lab in Denver, CO; all were found to be negative.
- Regional Conservation Officers and State Park Rangers assisted with the interdiction, inspection and education of boaters during their routine boater/angler checks. Written warnings and Notice to Appear in court citations was issued as needed.
    - 19 launch vehicles were recorded in the FATPOT system as non-compliant for display of the Decontamination Certification Form; all were issued a written non-compliance notice.

Kolob Reservoir

- Effort typically involved one 8-hr shift per week between mid April and mid September.
- One $13,400 trailer-mounted decontamination unit purchased by UDWR with General Fund in an earlier fiscal year is stationed at the Southern Region office; it was used when required.
- 29 boats were interdicted, inspected as needed, and educated about AIS.
- 54 AIS contacts were educated.
- No boats needed professional decontamination due to a lack of their stated use within the prior 30 days on a quagga, zebra or false dark mussel affected water body.
    - No boats were encrusted with invasive mussels.
- Boater History of Last Water Visited (N = 29 interviews)

    Top 5 Last Waters Visited

    1. Kolob Reservoir = 17 (59%)
    2. Panguitch Lake = 3 (10%)
    3. Sand Hollow Reservoir = 3 (10%)
    4. Quail Creek Reservoir = 2 (7%)
    5. Other/Unknown = 4 (14%)

- Plankton samples for presence/absence of *Dreissena* veligers were collected and sent to the Bureau of Reclamation's microscopy lab in Denver, CO; all were found to be negative.
- Regional Conservation Officers and State Park Rangers assisted with the interdiction, inspection and education of boaters during their routine boater/angler checks. Written warnings and Notice to Appear in court citations was issued as needed.
    - 10 launch vehicles were recorded in the FATPOT system as non-compliant for display of the Decontamination Certification Form; all were issued a written non-compliance notice.

Otter Creek/Piute reservoir complex (Otter Creek Reservoir and Piute Reservoir)

Otter Creek Reservoir

- The budget was $6,756 and AIS personnel performed for 5.0 months (May thru September) or 0.42 FTE as follows:
    - SP&R implemented the Plan.
- One $13,400 trailer-mounted decontamination unit purchased by UDWR with General Fund in an earlier fiscal year is stationed at the reservoir.
- 932 boats were interdicted, inspected as needed, and educated about AIS.
    - 2,512 AIS contacts were educated.
- One boat needed professional decontamination due to their stated use within the prior 30 days on a quagga, zebra or false dark mussel affected water body.
    - No boats were encrusted with invasive mussels.
- Boater History of Last Water Visited (N = 122 interviews)

  Top 5 Last Waters Visited
  1. Otter Creek Reservoir = 75 (61%)
  2. Fish Lake = 7 (6%)
  3. Panguitch Lake = 7 (6%)
  4. Minersville Reservoir = 6 (5%)
  5. Other/Unknown = 27 (22%)
- Plankton samples for presence/absence of *Dreissena* veligers were collected and sent to the Bureau of Reclamation's microscopy lab in Denver, CO; all were found to be negative.
- Regional Conservation Officers and State Park Rangers assisted with the interdiction, inspection and education of boaters during their routine boater/angler checks. Written warnings and Notice to Appear in court citations was issued as needed.
    - 82 launch vehicles were recorded in the FATPOT system as non-compliant for display of the Decontamination Certification Form; all were issued a written non-compliance notice.

Piute Reservoir

- The budget was $5,395 and AIS personnel performed for 4.0 months (May thru August) or 0.33 FTE as follows:

        - SP&R implemented the Plan.
            - The AIS Technician position at Piute State Park was not filled, due to a lack of qualified applicants. However, employees from Otter Creek State Park did provide some coverage a Piute Reservoir during the 2012 boating season. Extra effort will be made to ensure the position does not go unfilled during the 2013 boating season.
    - The decontamination unit at Otter Creek State Park was used when required.
    - 46 boats were interdicted, inspected as needed, and educated about AIS.
        - 116 AIS contacts were educated.
    - Boats needing decontamination were sent to Otter Creek State Park and are included in the Otter Creek Reservoir decontamination assessment.
        - No boats were encrusted with invasive mussels.
    - Boater History of Last Water Visited (N = 46 interviews)

      Top 5 Last Waters Visited
      1. Piute Reservoir = 28 (61%)
      2. Yuba Reservoir = 4 (9%)
      3. Otter Creek Reservoir = 3 (7%)
      4. Panguitch Lake = 2 (4%)
      5. Other/Unknown = 9 (20%)
    - Plankton samples for presence/absence of *Dreissena* veligers were collected and sent to the Bureau of Reclamation's microscopy lab in Denver, CO; all were found to be negative.
    - Regional Conservation Officers and State Park Rangers assisted with the interdiction, inspection and education of boaters during their routine boater/angler checks. Written warnings and Notice to Appear in court citations was issued as needed.
        - 13 launch vehicles were recorded in the FATPOT system as non-compliant for display of the Decontamination Certification Form; all were issued a written non-compliance notice.

Panguitch Lake

- The budget was $10,514and AIS personnel performed for 3.11 months (Memorial Day thru Labor Day) or 0.26 FTE as follows:
    - UDWR implemented the Plan.
        - One US Forest Service funded Technician I position.
- One $13,400 trailer-mounted decontamination unit purchased by US Forest Service in an earlier fiscal year is stationed at the lake.
- 261 boats were interdicted, inspected as needed, and educated about AIS.
  Note: Over 50% were from Nevada and California, states with numerous water bodies infested by quagga and zebra mussels.
    - 543 AIS contacts were educated.
- No boats needed professional decontamination due to a lack of their stated use within the prior 30 days on a quagga, zebra or false dark mussel affected water body.

- No boats were encrusted with invasive mussels.
- A single dead quagga mussel was found on the trailer of a boat that had already launched. An investigation determined the watercraft had been professionally decontaminated before launching.

- Boater History of Last Water Visited (N = 261 interviews)

  Top 5 Last Waters Visited

  1. Panguitch Lake = 144 (55%)
  2. Lake Mead = 12 (5%)
  3. Sand Hollow Reservoir = 8 (3%)
  4. Quail Creek Reservoir = 7 (3%)
  5. Other/Unknown = 90 (34%)

- Plankton samples for presence/absence of *Dreissena* veligers were collected and sent to the Bureau of Reclamation's microscopy lab in Denver, CO; all were found to be negative.
- Regional Conservation Officers and State Park Rangers assisted with the interdiction, inspection and education of boaters during their routine boater/angler checks. Written warnings citations were given to boaters that were non-compliant with the self-certification process. No "Notice to Appear" in court citations was issued.
  - 14 launch vehicles were recorded in the FATPOT system as non-compliant for display of the Decontamination Certification Form; all were issued a written non-compliance notice.

Sand Hollow State Park Complex (Sand Hollow, Quail Creek and Gunlock reservoirs)

Sand Hollow Reservoir

- The budget was $70,235 and AIS personnel performed for 26 months or 2.17 FTE as follows:
  - SP&R implemented the Plan.
    - Three Lead Ranger Aides performed for 7 months each (March thru September).
    - One Lead Ranger Aide performed for 5 months (October thru February).
    - UDWR Volunteers accounted for 853 personnel hours or approximately $17,799 of AIS work at the Sand Hollow State Park Complex.
- Four $13,400 trailer-mounted decontamination units purchased by UDWR in earlier fiscal years are stationed at the reservoir.
- 15,174 boats were interdicted, inspected as needed, and educated about AIS.
  - 42,624 AIS contacts were educated.
- 1,572 boats needed professional decontamination due to either (a) their stated use within the prior 30 days on a quagga, zebra or false dark mussel affected water body, or (b) they were departing Sand Hollow Reservoir for use on another water body before they could become dry via the Clean, Drain & Dry protocol.
  - One boat was encrusted with dead quagga mussels; it originated from Lake Mead.

- Boater History of Last Water Visited (N = 15,174 interviews = all boats to enter the park)

  Top 6 Last Water Visited

  1. Sand Hollow Reservoir = 10,694 (70%)
  2. Quail Creek Reservoir = 839 (6%)
  3. Lake Powell = 680 (4%)
  4. Lake Mead = 257 (2%)
  5. Gunlock Reservoir = 237 (2%)
  6. Other/Unknown = 2,467 (16%)

- Sand Hollow Reservoir remains classified as "infested" due to the find of a single, live adult (20mm) quagga mussel on the underwater side of a boat dock in May 2010. Despite intense ongoing searches, which included substrate samplers, shoreline inspections, scuba diving and plankton tow assessment via microscopy and eDNA, no further evidence of adults or veligers has since been found. However, PCR assessment of the plankton tow samples for Dreissenids showed evidence for quagga mussel eDNA throughout most (April through November) of the 2011 boating season and for a couple of samples (May & June) in the 2012 boating season. This find does not affect the reservoir's current classification as infested, and will not result in modification to the ongoing implementation of the control plan.
  Note: Reassessment of the reservoir's classification will not occur until three consecutive years for no evidence of Dreissenid mussels (visual or eDNA) occurs.

  - Quail Creek Reservoir can deliver water via a pipe to Sand Hollow Reservoir. And Sand Hollow Reservoir can pump water to a point upstream of Quail Creek Reservoir, there by swapping water between reservoirs when needed. However, an exchange of water between the reservoirs has not occurred for several years. Despite intense searches, which included substrate samplers, shoreline inspections, scuba diving and plankton tow assessment via microscopy and eDNA, no evidence of Dreissenid adults or veligers has ever been found from Quail Creek Reservoir. Interestingly, PCR assessment of the plankton tow samples for Dreissenids showed evidence for quagga mussel eDNA during just the September/October pooled sample from the 2011 boating season. A similar positive eDNA discovery for quagga mussel occurred from the June 2012 sample. Since these finds were not supported by microscopy or additional DNA finds, it does not affect the reservoirs current classification as "not detected," and will not result in modification to the ongoing implementation of the control plan.

- Regional Conservation Officers and State Park Rangers assisted with the interdiction, inspection and education of boaters during their routine boater/angler checks. No "Notice to Appear" in court citations was issued for AIS violations.
  - No launch vehicles were recorded into the FATPOT system as non-compliant for display of the Decontamination Certification Form; 100% compliance.

Quail Creek Reservoir

- The budget was $18,849 and AIS personnel performed for 7 months or 0.58 FTE as follows:
    - SP&R implemented the Plan.
        - One Lead Ranger Aide performed for 7 months (March thru September).
          Note: During the 5 month period of October thru January, a Lead Ranger Aide from nearby Sand Hollow State Park provides assistance.
        - UDWR Volunteers accounted for 853 personnel hours or approximately $17,799 of AIS work at the Sand Hollow State Park Complex, which included AIS work at Quail Creek State Park.
- One $13,400 trailer-mounted decontamination units purchased by UDWR in earlier fiscal years is assigned at the reservoir. Since there is no suitable area to conduct decontaminations, the unit is maintained at nearby Sand Hollow State Park and boaters are sent there for decontamination work.
- 4,279 boats were interdicted, inspected as needed, and educated about AIS.
    - 9,802 AIS contacts were educated.
- Boats needing professional decontamination due to their stated use within the prior 30 days on a quagga, zebra or false dark mussel affected water body, were sent to nearby Sand Hollow State Park. Thus, data for decontamination work is included in the Sand Hollow State Park statistics.
- Boater History of Last Water Visited (N = 4,279 interviews = all boats to enter the park)

  Top 5 Last Water Visited
  1. Quail Creek Reservoir = 2,379 (56%)
  2. Sand Hollow Reservoir = 584 (14%)
  3. Lake Powell = 243 (6%)
  4. Gunlock Reservoir = 105 (2%)
  5. Other/Unknown = 968 (23%)
- Quail Creek Reservoir remains classified as "not detected." It can deliver water via a pipe to Sand Hollow Reservoir. And Sand Hollow Reservoir can pump water to a point upstream of Quail Creek Reservoir, there by swapping water between reservoirs when needed. However, an exchange of water between the reservoirs has not occurred for several years. Despite intense searches, which included substrate samplers, shoreline inspections, scuba diving and plankton tow assessment via microscopy and eDNA, no evidence of Dreissenid adults or veligers has ever been found from Quail Creek Reservoir. Interestingly, PCR assessment of the plankton tow samples for Dreissenids showed evidence for quagga mussel eDNA during just the September/October pooled sample from the 2011 boating season. A similar positive eDNA discovery for quagga mussel occurred from the June 2012 sample. Since these finds were not supported by microscopy or additional DNA finds, it does not affect the reservoirs current classification as “not detected,” and will not result in modification to the ongoing implementation of the control plan.

- Sand Hollow Reservoir remains classified as "infested" due to the find of a single, live adult (20mm) quagga mussel on the underwater side of a boat dock in May 2010. Despite intense ongoing searches, which included substrate samplers, shoreline inspections, scuba diving and plankton tow assessment via microscopy and eDNA, no further evidence of adults or veligers has since been found. However, PCR assessment of the plankton tow samples for Dreissenids showed evidence for quagga mussel eDNA throughout most (April through November) of the 2011 boating season and for a couple of samples (May & June) in the 2012 boating season. This find does not affect the reservoir's current classification as infested, and will not result in modification to the ongoing implementation of the control plan.
  Note: Reassessment of the reservoir's classification will not occur until three consecutive years for no evidence of Dreissenid mussels (visual or eDNA) occurs.

- Regional Conservation Officers and State Park Rangers assisted with the interdiction, inspection and education of boaters during their routine boater/angler checks. No "Notice to Appear" in court citations was issued for AIS violations.
  - No launch vehicles were recorded into the FATPOT system as non-compliant for display of the Decontamination Certification Form; 100% compliance.

Gunlock Reservoir

- The budget was $16,216 and AIS personnel performed for 6 months or 0.50 FTE as follows:
  - SP&R implemented the Plan.
    - One Lead Ranger Aide performed for 6 months (April thru September).
      Note: During the 6 month period of October thru March, the park was closed to motorboat access.
    - UDWR Volunteers accounted for 853 personnel hours or approximately $17,799 of AIS work at the Sand Hollow State Park Complex, which included AIS work at Gunlock State Park.
- One $13,400 trailer-mounted decontamination units purchased by UDWR in an earlier fiscal year is assigned at the reservoir.
- 513 boats were interdicted, inspected as needed, and educated about AIS.
  - 1,471 AIS contacts were educated.
- No boats needed professional decontamination due to their lack of stated use within the prior 30 days on a quagga, zebra or false dark mussel affected water body..
- Boater History of Last Water Visited (N = 513 interviews = all boats to enter the park)

  Top 5 Last Water Visited
  1. Gunlock = 262 (51%)
  2. Sand Hollow Reservoir = 67 (13%)
  3. Quail Creek Reservoir = 52 (10%)

4. Lake Powell = 30 (6%)
5. Other/Unknown = 102 (20%)

- Plankton samples for presence/absence of *Dreissena* veligers were collected and sent to the Bureau of Reclamation's microscopy lab in Denver, CO; all were found to be negative.
- Regional Conservation Officers and State Park Rangers assisted with the interdiction, inspection and education of boaters during their routine boater/angler checks. No "Notice to Appear" in court citations was issued for AIS violations.
    - No launch vehicles were recorded into the FATPOT system as non-compliant for display of the Decontamination Certification Form; 100% compliance.

Work Completed on Other Non-Dreissena AIS in the Southern Region

- **Non-Dreissena AIS Inspections**
    - AIS presence/absence survey was completed on Ranch Creek (fish transfer site) at UTM 12S 0416673 E 4195257 N on May 21st 2012. No AIS were found and a plankton sample was negative for *Dreissena* mussel DNA.
    - AIS presence/absence survey was completed on Salina Creek (fish transfer site) at UTM 12S 0453643 E 4308462 N on May 21st 2012. No AIS were found and a plankton sample was negative for *Dreissena* mussel DNA.
    - AIS presence/absence survey was completed on Kolob Reservoir (egg collection site) at UTM 12S 0319133 E 4146624 N on May 22nd 2012. No AIS were found and a plankton sample was negative for *Dreissena* mussels.
    - AIS presence/absence survey was completed on Dougherty Basin Reservoir (egg collection site) at UTM 12S 0426471 E 4197325 N on May 23rd 2012. No AIS were found and a plankton sample was negative for *Dreissena* mussels.
    - AIS presence/absence survey was completed on West Fork Boulder Creek (fish transfer site) at UTM 12S 0458672 E 4206244 N on June 4th 2012. No AIS were found and a plankton sample was negative for *Dreissena* mussel DNA.
    - AIS presence/absence survey was completed on North Creek (fish transfer site) at UTM 12S 0365947 E 4246946 N on June 5th 2012. No AIS were found and a plankton sample was negative for *Dreissena* mussel DNA.
    - AIS presence/absence survey was completed on Pole Creek (fish transfer site) at UTM 12S 0379042 E 4271358 N on June 19th 2012. No AIS were found and a plankton sample was negative for *Dreissena* mussel DNA.
    - AIS presence/absence survey was completed on Manning Meadow Reservoir (egg collection site) at UTM 12S 0406455 E 4260239 N on June 22nd 2012. No AIS were found and a plankton sample was negative for *Dreissena* mussels.
    - An AIS presence/absence survey was completed at Wahweap State Fish Hatchery. The spring water source, ponds, and pond outflows were the main areas inspected. Sampling was conducted July 9th 2012 at UTM 12S 0440164 E 4106243 N by AIS biologist and hatchery supervisor. No AIS were found.

- An AIS presence/absence survey was completed at Glenwood State Fish Hatchery. The spring water source, raceways, indoor circular tanks, and hatchery outflow were the main areas inspected. Sampling was conducted July 26th 2012 at UTM 12S 0415197 E 4290121 N by AIS biologist and hatchery supervisor. No AIS were found.
- An AIS presence/absence survey was completed at J. Perry Egan State Fish Hatchery. The spring water source, raceways, indoor structures, and hatchery outflow were the main areas inspected. Sampling was conducted July 31st 2012 at UTM 12S 0451884 E 4238506 N by AIS biologist and hatchery supervisor. No AIS were found.
- Watermilfoil samples at Fish Lake were collected August 8th 2012 at UTM 12 N 0602290, 4467708. All samples were watermilfoil **POSITIVE** (9 Eurasian watermilfoil and 1 Eurasian x northern watermilfoil hybrid).
- An AIS presence/absence survey was completed at Mammoth Creek State Fish Hatchery. The spring water source, raceways, indoor troughs, tanks, and structures, settling ponds, and hatchery outflow were the main areas inspected. Sampling was conducted August 30th 2012 at UTM 12S 0370024 E 4164985 N by AIS biologist and hatchery supervisor. No AIS were found.
- An AIS presence/absence survey was completed on Corn Creek at UTM 12S 0381430 E 4290305 N on September 17th 2012. Snail specimens were collected and sent for ocular and genetic identification. Results for these samples were NZMS **POSITIVE**.
- Snail specimens were collected from Beaver Dam Wash – NV State Park at UTM 11S 0758850 E 4155200 N on October 3rd 2012. Snail specimens were sent for ocular and genetic identification. Results for these samples were NZMS **POSITIVE**.
- AIS presence/absence survey was completed on Virgin River – Springs Park (fish transfer site) at UTM 12S 0274440 E 4107815 N on October 15th 2012. No AIS were found and a plankton sample was negative for *Dreissena* mussel DNA.
- AIS presence/absence survey was completed on Virgin River – Gorge (fish transfer site) at UTM 12S 0249869 E 4092493 N on October 15th 2012. No AIS were found and a plankton sample was negative for *Dreissena* mussel DNA.
- AIS presence/absence survey was completed on Santa Clara River (fish transfer site) at UTM 12S 0269019 E 4106987 N on October 15th 2012. No AIS were found and a plankton sample was negative for *Dreissena* mussel DNA.
- AIS presence/absence survey was completed on Beaver Dam Wash (fish transfer site) at UTM 11S 0764146 E 4114412 N on October 15th 2012. No AIS were found and a plankton sample was negative for *Dreissena* mussel DNA.
- AIS presence/absence surveys were completed on 11 additional waters outside of hatchery, egg collection, and fish transfer sites in the Southern Region during 2012. No AIS were found.

- **New Zealand Mudsnail at Loa Hatchery**

- AIS presence/absence inspection was completed at Loa State Fish Hatchery. The spring water source, raceways, and outflows were the main areas inspected. Sampling was conducted July 26th 2012 at UTM 12S 0440164 E 4106243 N by AIS biologist and hatchery supervisor.
    - Several snail specimens were identified as NZMS by the region AIS biologist and hatchery supervisor. The specimens were preserved and sent to a UDWR research zoologist for ocular identification and Pisces Molecular for genetic identification. The samples were positive via ocular analysis and negative via PCR methods. However, additional specimens were sent to Pisces Molecular and tested positive via PCR.
    - Loa Hatchery adopted a policy to cease stocking in NZMS-negative waters after NZMS were rediscovered in the hatchery, in order to prevent spreading the invasive species.
    - AIS inspections were then conducted in the fall of 2012 at 27 NZMS-negative waters, which were stocked before the policy took effect. The AIS inspections were intended to establish the current status of NZMS and other AIS in the 27 waters.
    - NZMS were not observed in any of the 27 waters inspected. However, possible watermilfoil was observed in several of the 27 waters, so additional sampling is scheduled in 2013 to determine watermilfoil presence/absence and species.
    - It does not appear that NZMS populations existed in any of the 27 waters prior to stocking by Loa Hatchery in 2012 and the data collected should provide a useful baseline for comparison with future AIS inspections.

END